



Dissolution of Ellansé: In Vivo Evidence and Electron Microscopic Validation

Larry Wu^{1*}, MBBS, MRCS, MMED, MFA, Sandeep Rohilla¹, MBBS, FDFM, Chuan-Yuan², Lin, MD

¹iCare Medical Centre

²Li-An Medical Clinic, 4F., No. 267, Lequn 2nd Road, Zhongshan, Taipei City 104452, Taiwan.

Article Details

Article Type: Research Article

Received date: 31st July, 2025

Accepted date: 25th September, 2025

Published date: 27th September, 2025

***Corresponding Author:** Larry Wu, MBBS, MRCS, MMED, MFA, iCare Medical Centre, 22 Havelock Road, Singapore.

Citation: Wu, L., Rohilla, S., & Lin, C. Y., (2025). Dissolution of Ellansé: In Vivo Evidence and Electron Microscopic Validation. *J Dermatol Adv Clin Care*, 3(2): 108. doi: <https://doi.org/10.33790/jdacc1100108>.

Copyright: ©2025, This is an open-access article distributed under the terms of the [Creative Commons Attribution License 4.0](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract

Background: Ellanse is a polycaprolactone-based collagen stimulator that requires a higher level of injectors skills, primarily due to the absence of a reversal agent. Inadvertently injected Ellanse can contribute to nodule formation, which has limited treatment options.

Aim: We present two lines of evidence demonstrating the degradation of Ellansé's polycaprolactone (PCL) microspheres following treatment with a collagenase mixture:

1) Scanning Electron Microscopy (SEM) image illustrating morphological changes of microsphere degradation include fissures, flaking off microsphere surface and collapse of microspherical structure and 2) in-vivo experiment with 3-months follow up as evidence of Ellanse polycaprolactone microsphere degradation and inhibition of neocollagenesis.

Method: 0.1 ml aliquot of Ellanse M is mixed with 0.5 ml of collagenase mixture. Within five minutes of mixing, the Ellanse gel has transitioned into a solution. The resultant solution is allowed to dry naturally. A separate 0.1 ml Ellanse M aliquot is prepared as a control and allowed to dry naturally. Both samples are submitted for SEM analysis at Yong Loo Lin School of Medicine, National University of Singapore. The slides are analysed under 500 times and 5000 times magnifications. A separate in-vivo experiment is conducted with two intradermal deposits of 0.1 ml Ellanse M (Designated D 1 and D 2). D1 is treated with 0.5 ml of collagenase mixture and massaged for 5 minutes while D2 serves as an untreated control. Follow-up assessments were conducted at three months to assess the effectiveness of neocollagenesis inhibition.

Results: For the SEM analysis, the SEM images demonstrate extensive disruption of the polycaprolactone (PCL) microspheres. Observations include surface fissuring, fragmentation and collapse of the microspherical architecture. In contrast, the control sample displayed intact PCL microspheres with smooth, well-preserved surfaces. For the in vivo experiment, at the 3-month follow-up, the treated deposit (D1) appeared flat and non-palpable confirming that

polycaprolactone microspherical destruction is effective in inhibiting collagenesis. The untreated deposit (D2) has evolved into a hard nodule consistent with neocollagenesis.

Conclusion: These findings provide both ultrastructural (SEM) and clinical (in vivo) evidence supporting the use of collagenase mixture as a potential tool for teaching Ellansé injection.

Key words: Ellanse; Neocollagenesis, Scanning Electron Microscopy; Polycaprolactone; Hydrolytic Degradation

Introduction

Ellansé is a polycaprolactone (PCL)-based collagen stimulator designed for facial [1] and body rejuvenation [2]. While it offers long-lasting and biostimulatory benefits, mastering its injection technique can be challenging—particularly for newer injectors—due to the absence of a reliable dissolution agent for misplaced product. The development of a collagenase-based mixture as a potential antidote marks a significant advancement in training and safety protocols. This breakthrough may enhance confidence among practitioners and support broader adoption of Ellansé in aesthetic practice.

Method

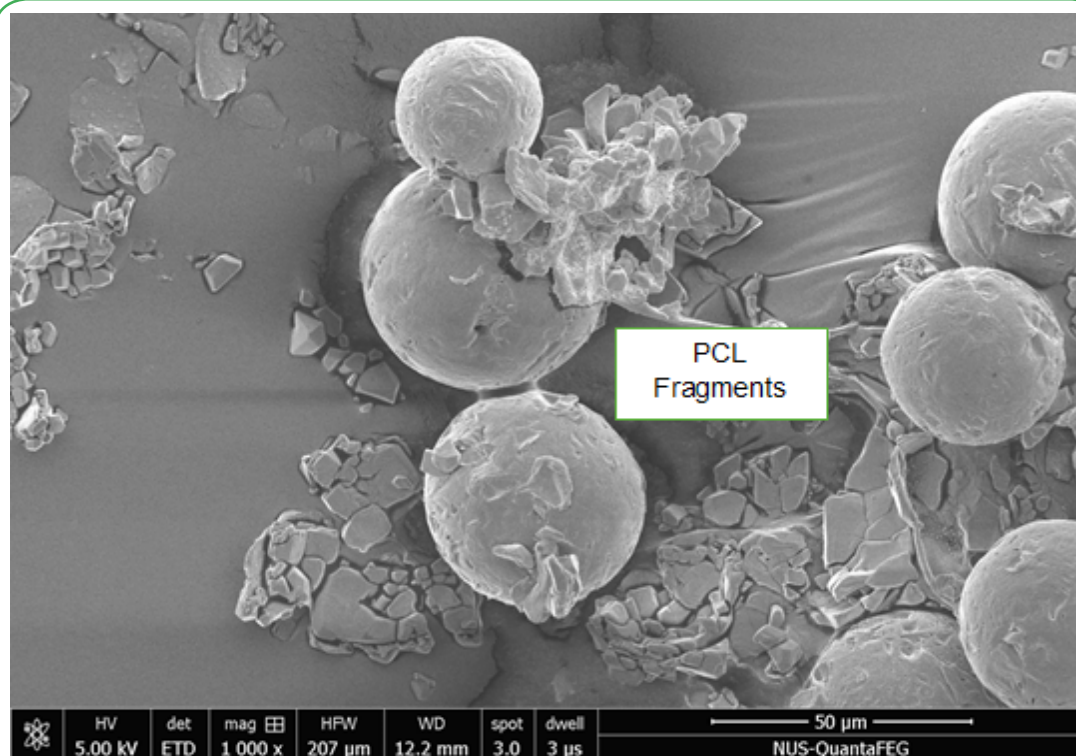
2 sets of 0.1 ml of Ellanse M aliquot Serial number 060.05888500416 are injected onto microscopic slides. 0.5 ml of collagenase mixture is added to 1 aliquot and mixed for 5 minutes. The other Ellanse M aliquot is allowed to act as a control. Both sets are allowed to dry in a well aerated environment at room temperature. As polycaprolactone has a melting point of 60 degrees, drying in room temperature is to ensure any changes are a result of collagenase mixture and not overheating [3]. The 2 sets are submitted for independent Scanning Electron Microscopy analysis at Yong Loo Lin School of Medicine in National University of Singapore. Samples are mounted onto SEM aluminium stubs with carbon tapes and coated with a layer of gold before SEM imaging. The images are taken with Quanta 650 FEGSEM (ThermoFisher Scientific) at 5kV Schottky Field Emission. The specimens are analysed under 500 and 5000 times magnification.

A separate experiment was conducted to demonstrate the inhibition of collagenesis following the dissolution of polycaprolactone. Two **intradermal deposits of 0.1 mL Ellansé M** (designated D1 and D2)

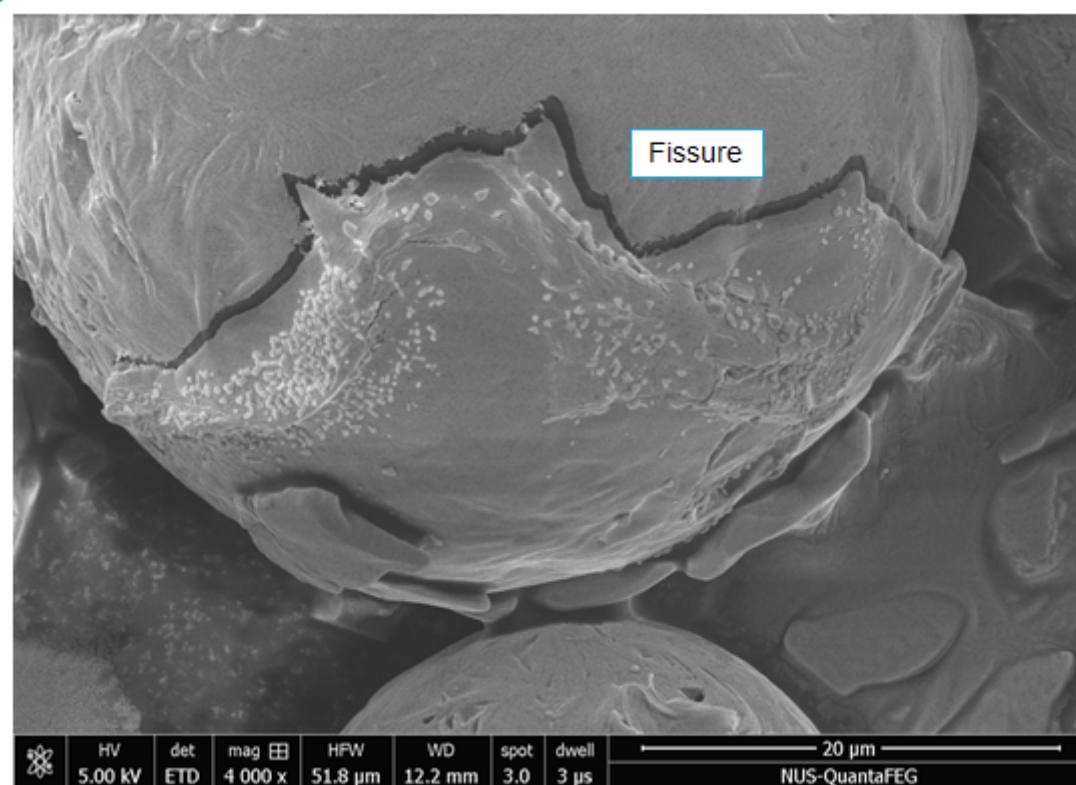
were administered. **D1** was treated with **0.5 mL of the collagenase mixture** followed by gentle massage, while **D2** was left untreated as a control. **Clinical follow-up was performed at 3 months post-treatment** to evaluate differences in tissue response and collagen formation. Informed consent was obtained from the patient and the research was conducted in accordance with the principles outlined in the Declaration of Helsinki, 2018 [4]. In addition, ethics approval for this study was granted by the ethics review board (Approval: IMAC/2025/733/005).

Results

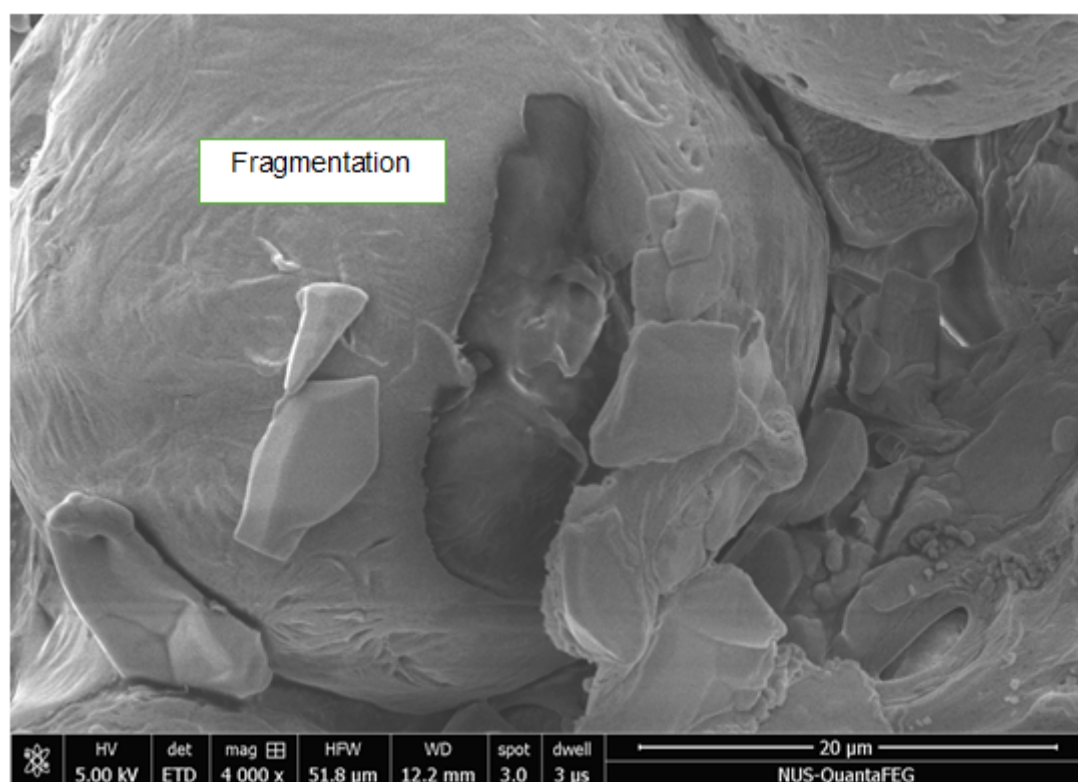
The scanning electron microscopic analysis demonstrates extensive degradation of polycaprolactone microspheres. The observations include the presence of fissuring, fragmentation and even collapse of the microspherical structure of polycaprolactone microspheres. (Picture 1, 2, 3 and 4) In the control specimen the microspherical structures are 100 % intact, indicating the difference in appearance can be attributed to addition of collagenase mixture. (Picture 5)



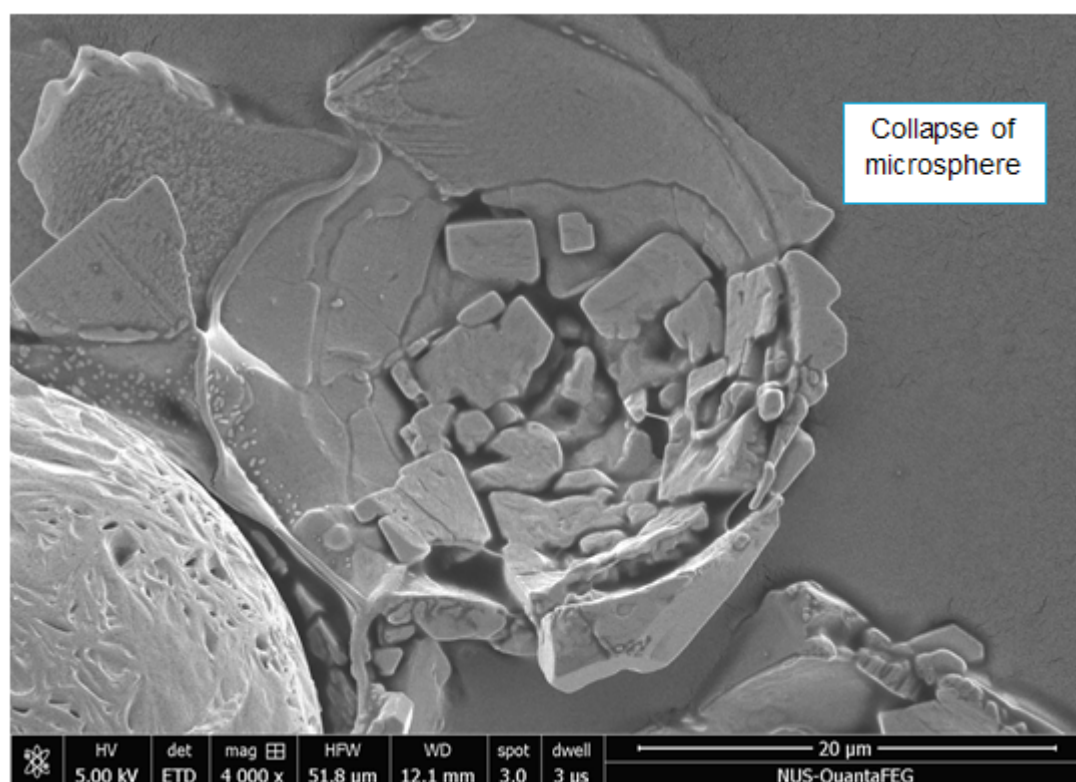
Picture 1 (Treated sample) SEM 1000 times magnification demonstrating extensive disruption of microspherical polycaprolactone architecture surrounded by disintegrated polycaprolactone fragments.



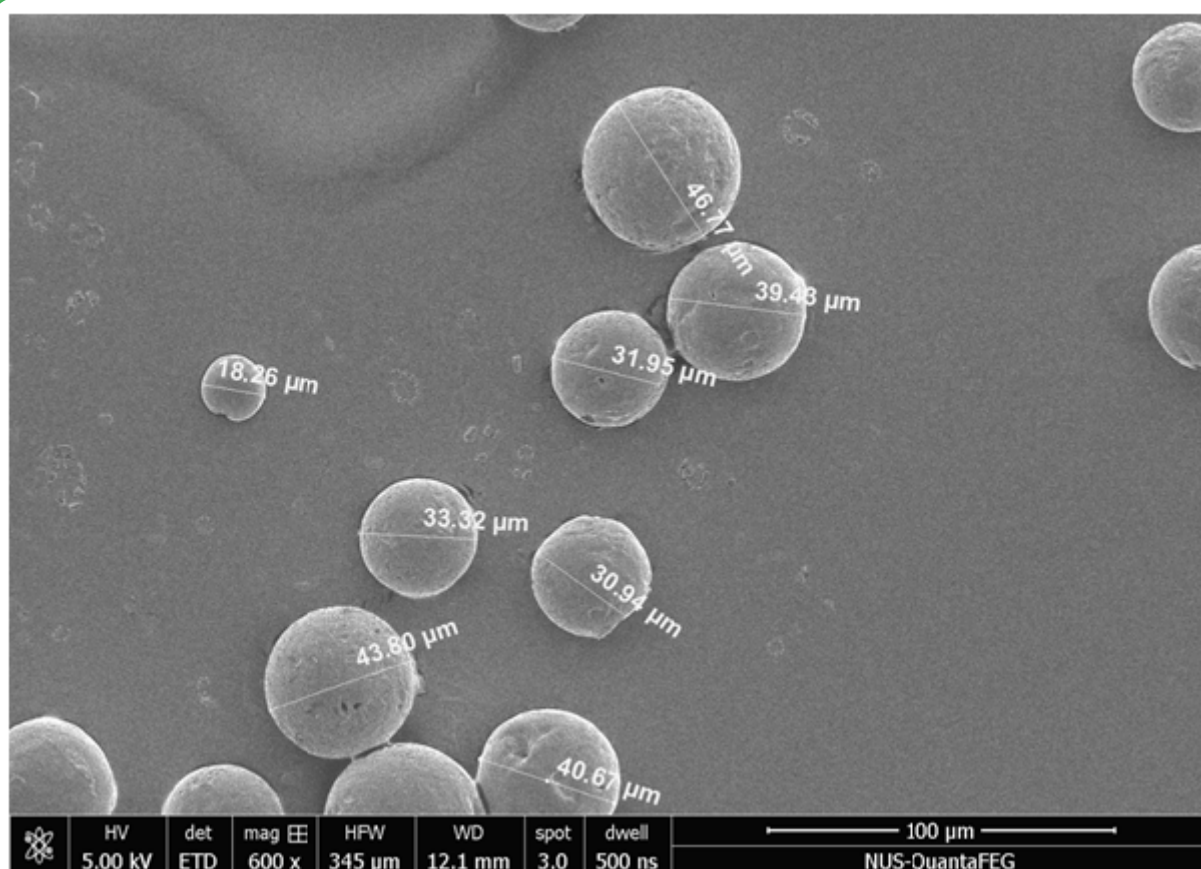
Picture 2 (Treated sample) SEM 4000 times magnification demonstrating fissuring across the entire surface polycaprolactone microsphere.



Picture 3 (Treated sample) SEM 4000 times magnification demonstrating fracture and fragmentation of polycaprolactone microsphere.



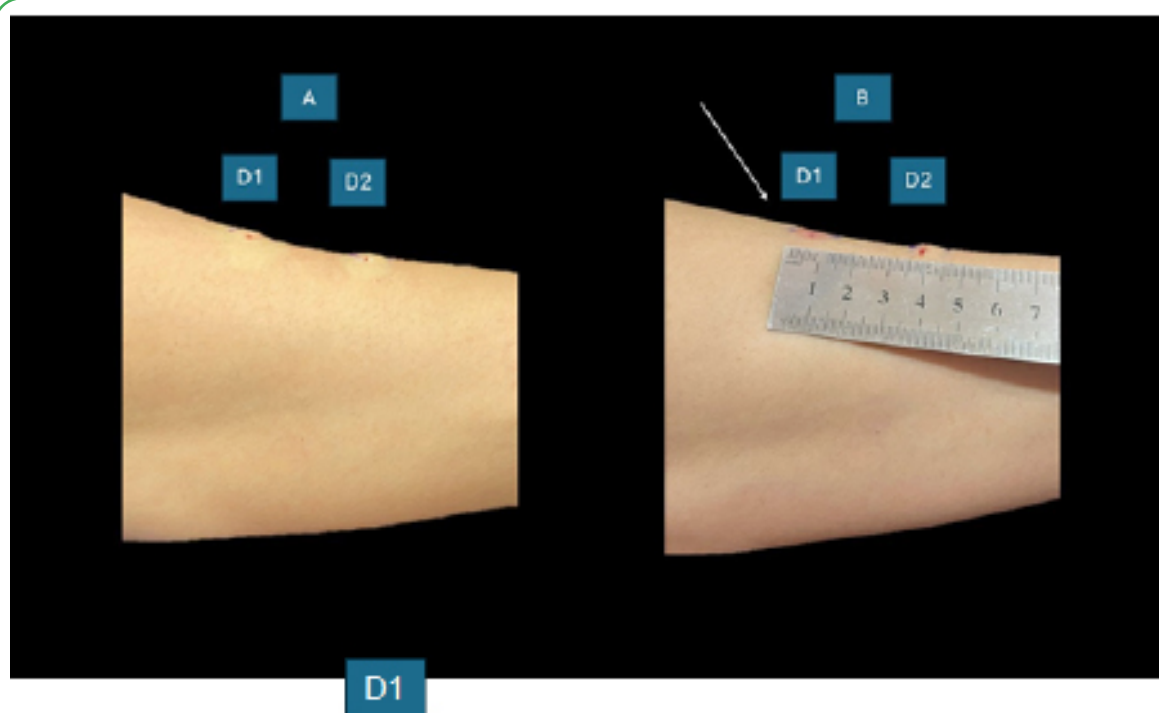
Picture 4 (Treated sample) SEM 4000 times demonstrating extensive disruption of polycaprolactone microsphere architecture with collapse of microspherical structure.



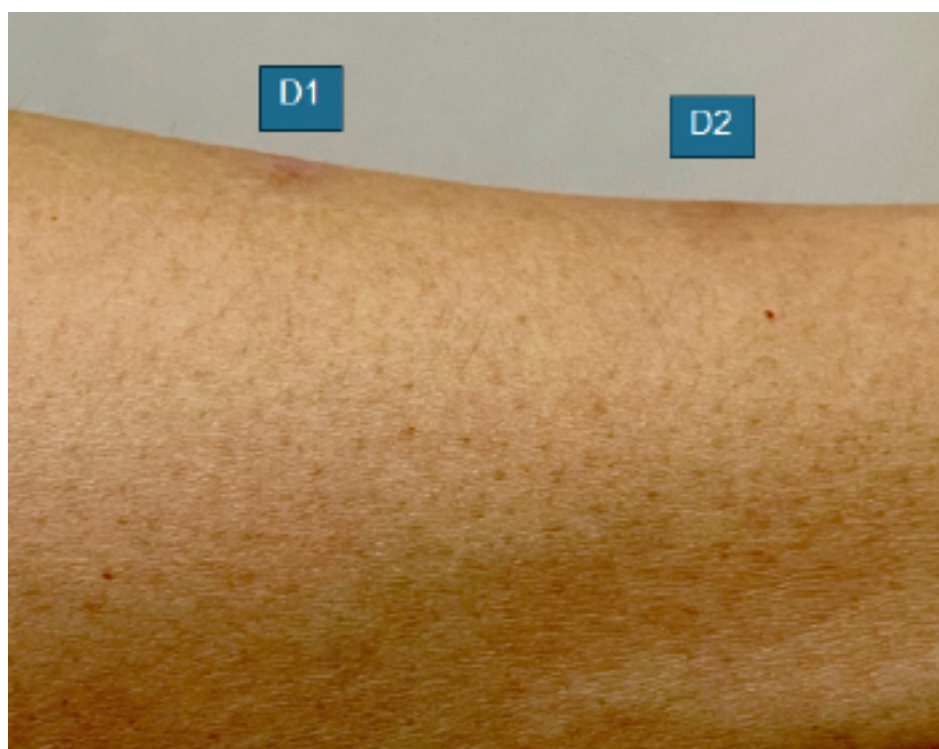
Picture 5 (Control sample) 600 times magnification showing intact polycaprolactone microspherical structures with diameter ranging from 18.25 micrometre to 46.77 micrometre. There is absence of fissure, fractures or collapse of microspheres.

In the in-vivo experimental arm, D1 (treated with collagenase) appears flat and non palpable indicating inhibition of neocollagenesis by collagenase mixture. D2, the control becomes a nodule. (See Picture 6 and 7) for before and after Ellanse inhibition with 3 months

follow up. As Ellanse is normally injected supraperiosteal or deep subcutaneous injection, the flattening and impalpability of the D1 site further supports the **efficacy of the collagenase mixture** in degrading misplaced Ellansé



Picture 6: (A) demonstrating 2 x 0.1 ml (D1 and D2) intradermal deposits of Ellanse M. (B) demonstrating dissolution (flattening) of Ellanse M (D1) after 0.5 ml of collagenase mixture and 5 minutes of massage. (See white arrow).



Picture 7: 3 months follow up demonstrating flattening of D1 intradermal deposit consistent with Ellanse neocollagenesis inhibition. D2 has developed into a nodule.

Discussion

Ellanse treatment has traditionally been reserved for experienced injectors with advanced skills sets, primarily due to the lack of a reliable dissolution agent. The complications related to Ellanse include nodules formation and inadvertent intravascular injection, both of which can be challenging to manage. The management of nodules include intralesional triamcinolone injection, consumption of **systemic immunosuppressants** such as oral methotrexate and surgical excision —each carrying its own set of limitations and potential risks [5].

Ellanse is composed of consists of 30 % polycaprolactone (PCL) microspheres embedded in 70 % carboxymethylcellulose (CMC) gel. The eventual aesthetic result is attributed to neocollagenesis, which takes three months while the CMC gel is gradually resorbed [6]. Previous reports indicate that collagenase can be effective in addressing nodule formation associated with Ellanse treatment [7] and Point Of Care Ultrasound (POCUS) is a valuable tool for assisting Ellanse practitioners address complications pertaining to Ellanse injection [8]. The aim of addressing undesired Ellanse injection is geared towards accelerating destruction of polycaprolactone microspheres and inhibiting neocollagenesis while the carboxymethylcellulose gel is naturally resorbed by the body.

The degradation of polycaprolactone microspheres undergoes two common pathways: 1) surface degradation and 2) bulk degradation [9]. In surface degradation, hydrolytic degradation, in which water molecules hydrolyses the ester bonds on the surface leading to hydrolysis and degradation. In bulk degradation, both hydrolytic degradation and chain scission occur. Hydrolytic degradation occurs by water molecules penetrating the polycaprolactone microsphere and hydrolyzing the ester bonds throughout the material, causing the entire polymer to degrade. In our SEM analysis of treated Ellanse, fissures, fragmentation and collapse of polycaprolactone microspherical architecture dramatically increases the surface area to volume ratio. Microspheres with a higher surface area to volume ratio degraded faster due to greater penetration of water into the sample [10]. This has no effect on the molecular weight (MW) of

polycaprolactone. A second mode of bulk degradation is chain scission, which is defined by a process where the polymer chains are broken down into smaller fragments due to hydrolysis of the ester bonds in the polymer backbone. The degradation of polymer chains lead to decrease in MW. The decrease in molecular weight of PCL will further accelerate the degradation of microsphere. In summary, the electron microscopy images demonstrate macroscopic structural disruption of polycaprolactone microspheres and hence allowing simultaneous surface and bulk degradation. The SEM finding is corroborated with our in vivo experiment that demonstrates effective inhibition of neocollagenesis in treated intradermal deposits (D1). Immediate administration of collagenase mixture results extensive disruption of polycaprolactone microspheres. At 3 months follow up, D1 has a flat, non palpable morphology as compared to a hard nodule in D2 the control sample. As Ellanse is generally administered in the suprapariosteal and deep subcutaneous layer of tissue, collagenase mixture treated Ellanse would be considered non palpable.

Limitations

The limitations in this research is the number of subject due to the difficulty in recruiting subjects for intradermal injections of Ellanse. In addition, there are different preparations of Ellanse include Ellanse S with a product longevity of 12 to 18 month, Ellanse with varying particles. More research would be required to determine if this collagenase mixture is applicable to dissolving them.

Conclusion

Our article demonstrates electron microscopic validation and in vivo evidence of Ellanse dissolution. Electron microscopic analysis demonstrates Ellanse microsphere integrity is extensively disrupted by collagenase mixture. This is demonstrated by the presence of extensive fissure, fragmentation and collapse of the polycaprolactone microspherical surface. Disruption of smooth microspherical surface allows penetration of water throughout the entire microsphere, hence allowing simultaneous surface and bulk degradation- accelerating the degradation of Ellanse. The in vivo experiment also demonstrates effective neocollagenesis inhibition capacity at 3 months interval following immediate administration of collagenase mixture. Based

on the SEM validation and in vivo experimentation, we would like to propose our collagenase mixture as a viable solution for addressing inadvertently placed Ellanse. This can be a useful addition to the teaching armatarium for new Ellanse injectors.

Acknowledgements

We are grateful to Micky Leong from Yong Loo Lin School of Medicine, National University of Singapore for scanning electron microscopy support and Catrina Calica for photography support.

Conflicts of Interest: The authors declare no conflict of interest.

Reference

1. Rezaee Khiabanloo, S., Nabie, R. and Aalipour, E., (2022). Effectiveness of jawline, jaw angle, and marionette lines correction in combination with double needles threads (APTOS) and a collagen-stimulating dermal filler (ELLANSE): An innovative technique. *Journal of Cosmetic Dermatology*, 21(10), pp.4727-4734.
2. Lowe, N.J. and Ghanem, A.M., (2020). Volume restoration of hands with polycaprolactone by cannula delivery; a prospective single center consecutive case series evaluation. *Journal of Cosmetic and Laser Therapy*, 22(2), pp.55-59.
3. Sivalingam G., Madras G., (2003), Thermal degradation of poly (ϵ -caprolactone), *Polymer Degradation and Stability*, Volume 80, Issue 1.
4. WMA Declaration of Helsinki—Ethical Principles for Medical Research Involving Human Subjects. World Medical Association; 2018.
5. Ianhez, M., de Goés e Silva Freire, G., Sigrist, R.M.S., Colpas, P.T., de Faria, I.A., Parada, M.O.A.B. and Miot, H.A., (2024). Complications of collagen biostimulators in Brazil: Description of products, treatments, and evolution of 55 cases. *Journal of Cosmetic Dermatology*.
6. Christen, M.O. and Vercesi, F., (2020). Polycaprolactone: how a well-known and futuristic polymer has become an innovative collagen-stimulator in esthetics. *Clinical, cosmetic and investigational dermatology*, pp.31-48.
7. Wu, L. (2025). iCare Technique of Dissolving Ellanse M Nodules Using Collagenase: A Case Series and Experimental Study. *J Cosmet Dermatol*. 24(5):e70201. doi: 10.1111/jocd.70201. PMID: 40296530; PMCID: PMC12038313.
8. Wu, L., Salti, G., Cotofana, S., & Vercesi, F., (2025). Point-of-Care Ultrasound (POCUS) for Precision Management in Ellanse-Treated Patients. *J Cosmet Dermatol*. Jun;24(6):e70262. doi: 10.1111/jocd.70262. PMID: 40448406; PMCID: PMC12125565.
9. Kayan, G. Ö., Kayan, A., (2023). Polycaprolactone Composites/ Blends and Their Applications Especially in Water Treatment. *ChemEngineering*. 7(6):104.
10. Bölgen, N., Menciloglu, Y. Z., Acatay, K., Vargel, I., Piskin, E., (2005). In vitro and in vivo degradation of non-woven materials made of poly(ϵ -caprolactone) nanofibers prepared by electrospinning under different conditions. *J Biomater Sci Polymer Edn*;16(12):1537e55